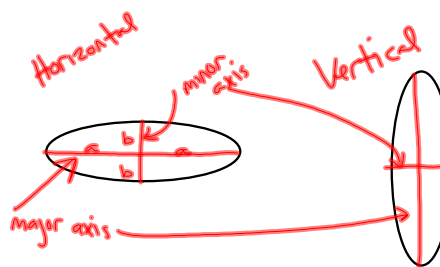
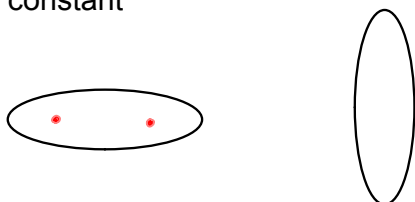


8.4 Ellipses

Ellipse--the set of all points such that the sum of the distances from a point to two fixed points (foci) is a constant

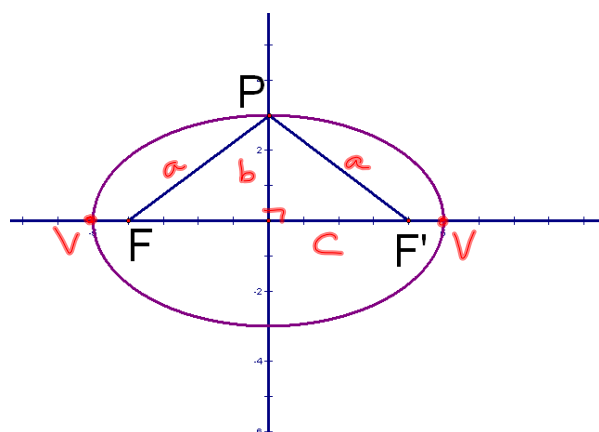


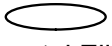
Axes are parallel to the coordinate axes


$2a$ = length of major axis

$2b$ = length of minor axis

c = distance from center to foci



Horizontal Ellipse  $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$

Vertical Ellipse  $\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$

$$a > b > 0$$

$$C(h, k)$$

$$a^2 = b^2 + c^2$$

$2a$ = sum of focal radii

Vertices-endpoints of major axis

GSP

Reflective properties

$$\frac{(x)^2}{9} + \frac{(y)^2}{16} = 1$$

$$C(0, 0)$$

$$a = 4$$

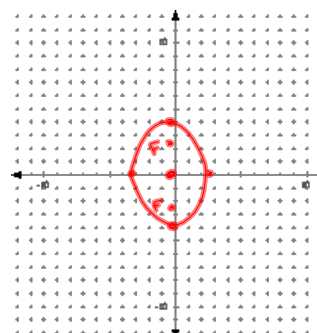
$$b = 3$$

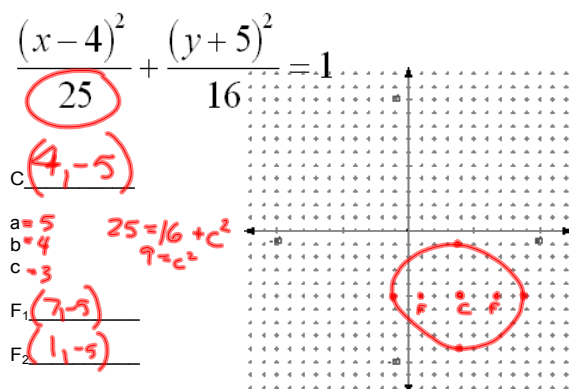
$$c = \sqrt{7}$$

$$F_1(0, \sqrt{7})$$

$$F_2(0, -\sqrt{7})$$

$$16 = 9 + c^2$$





$$9x^2 + 4y^2 - 18x + 16y - 11 = 0$$

$$\begin{aligned}
 9x^2 - 18x + 4y^2 + 16y &= 11 \\
 9(x^2 - 2x + 1) + 4(y^2 + 4y + 4) &= 11 + 9 + 16 \\
 9(x-1)^2 + 4(y+2)^2 &= 36 \\
 \frac{(x-1)^2}{4} + \frac{(y+2)^2}{9} &= 1
 \end{aligned}$$

Write the equation of an ellipse with a $C(0,0)$ and a horizontal major axis.

$$a = 6$$

$$b = 4$$

$$\frac{x^2}{36} + \frac{y^2}{16} = 1$$

C _____

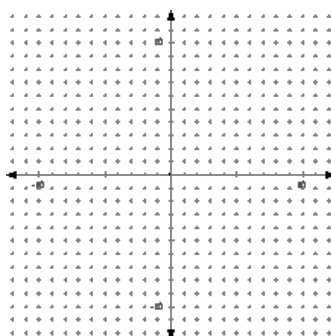
a _____

b _____

c _____

F_1 _____

F_2 _____



Write the equation of an ellipse with x-intercepts of $\pm\sqrt{2}$ and y-intercepts of ± 3

$$C(0,0)$$

$$\frac{x^2}{2} + \frac{y^2}{9} = 1$$

Write the equation of an ellipse with Foci, $F(0, -4)$ and $F(4, -4)$ and $a = 7$

Center is midpoint

of Foci

$$C(2, -4)$$

$$a^2 = b^2 + c^2$$

$$49 = b^2 + 16$$

$$\frac{(x-2)^2}{49} + \frac{(y+4)^2}{33} = 1$$

HW
p438
13-21 odd, 29, 35

Attachments

ellipse.gsp

ellipse(1).gsp